

ming on the 4th; and to South Dakota, western Nebraska, western Kansas, and Wyoming on the 5th.

On the morning of the 8th a cold, high area had developed over the Rocky Mountain region, and warnings either of frost or freezing temperature were issued on the 8th, 9th, and 10th to the Middle States, where vegetation had advanced sufficiently to be susceptible. By the morning of the 11th frost had advanced far beyond the eastern and southern limits of the Chicago district, causing great damage to fruit buds and bloom, which were abnormally advanced because of the previous high temperatures. Orchardists employed whatever protection was available to limit the damage, but few of them in the central area are provided with heaters.

On the morning of the 12th another disturbance had developed in the West, and this also moved directly eastward over the district, but its consequences were not as serious, as it was followed immediately by another disturbance.

The third one on the 15th appeared centered on the southeastern slope of the Rockies, and the characteristics of this storm were much the same as those of the first great disturbance of the month—snow and strong northerly winds and rapidly falling temperature. The snowfall, in fact, in the case of the third storm reached eastward across the middle Mississippi Valley and Great Lakes region, and it was exceptionally heavy in that area for the season of the year.

Live-stock warnings on the 14th were sent to stations in Wyoming and on the 15th to stations in Kansas and Nebraska; and warnings for frost or freezing temperature were issued on the 15th, 16th, 17th, and 18th for practically the same area covered by similar warnings earlier in the month. The damage done by this second freeze is considered most serious.

The fourth storm appeared over the Great Basin on the 19th, and this moved eastward across the Chicago district very slowly, accompanied by general precipitation, but as it was followed immediately by another disturbance much like the second one of the month, no damaging effects from freeze or wind resulted in any portion of this district, and no warnings seemed to be necessary.

The fifth one first appeared in the British Northwest on the 22d, but this did not reach its full development until the 24th, when it covered the Great Plains. It then seemed to lose some of its energy, but later redeveloped and by the 27th it had reached the upper Lake region and finally passed northeastward into Ontario.

Live-stock warnings were issued to points in Nebraska and southeast Wyoming on the 24th and warnings for either frost or freezing temperature on the 24th, 25th, 27th, 28th, and 29th for much the same area as covered by the two previous frost warnings; and by the morning of the 30th the frost area had again reached beyond the limits of the Chicago forecast district, although the temperatures did not fall nearly as low as during the previous frost.

The following communication from the official in charge at Cheyenne, Wyo., was received in connection with live-stock warnings of April 4:

Perhaps it may be of interest to know that the Corridale Sheep Co. thanked the local office over the phone for the live-stock warning of April 4, 1921.

They had a thousand high-bred ewes that were just beginning to lamb, and run sheep in both the Cheyenne and Laramie localities. The storm was more severe at Laramie, about 4 inches snow falling. To the westward of Laramie, over the southern Sweetwater district, reports indicate the falls ranged from 6 to 24 inches.

He also stated that to-day, although clear, is hard on lambing, as the wind which is averaging about 32 miles an hour with a temperature slightly above freezing soon chills the new-born lambs.—H. J. Cor.

NEW ORLEANS FORECAST DISTRICT.

Storm warnings were issued for the Texas coast on April 10, 12, 14, 16, and 24, and verifying velocities occurred during all displays except that ordered on the 14th, when the highest wind velocities did not exceed 27 and 28 miles.

Small-craft warnings were displayed on the Texas coast on the 4th, 5th, 8th, 16th, 21st, and 24th, and were justified. No storm occurred without warnings.

Frost occurred in some part of the district on the 10th, 17th, 18th, and occurred generally over the interior of the district on the 11th and 19th, for all of which warnings were issued. No frost of any extent occurred without warnings.

Fire-weather warnings were issued for national forests in Arkansas and Oklahoma on the 4th.

A "norther" warning for the benefit of shipping in the vicinity of Tampico, Mexico, was issued on the 16th.—*I. M. Cline.*

DENVER FORECAST DISTRICT.

Several Alberta storms, all of which were attended by the development of secondary low-pressure systems in the Plateau region, dominated weather conditions during April. The weather of the month contrasted sharply with the mild and pleasant weather of the preceding months of 1921. The mean temperature was below the normal throughout the district, and there were frequent alternations of warm and cold periods.

On the morning of the 3d a low-pressure center of considerable intensity was over Nevada. Advises of strong winds were issued for the district, and cold-wave warnings were issued for western Utah on the evening of the 3d. Strong winds in localities were followed by a fall in temperature of 30° in western Utah, with readings as low as 24°. Warnings of freezing temperatures were issued on the 5th, 6th, 7th, 8th, and 9th for large areas in the district, following the eastward movement of the storm.

The warnings of the 5th advised that temperatures would be below the freezing point in the fruit valleys of western Colorado, those of the 6th considerably below, and those of the 7th considerably below in the fruit valleys of western Colorado and northwestern New Mexico. Temperatures ranging from 12° to 20° occurred in the fruit valleys mentioned on the mornings of the 7th and 8th. On the evening of the 13th a storm of marked intensity was central in Utah. Warnings of strong winds were issued for Arizona and Utah, with rain turning to snow in Utah and northwestern Arizona, and much colder weather in Utah. Strong winds occurred in localities and were followed by rain turning to snow. The temperature fell 20° to 28° in Utah, with readings as low as 26° to 32°. Warnings of freezing temperature or temperature below the freezing point were issued for the fruit valleys of Colorado and northwest New Mexico on the mornings of the 14th, 15th, and 16th. The temperatures in western Colorado on the morning of the 16th ranged from 20° to 27°. The storm center was over southeastern Colorado on the morning of the 15th, with high pressure in the northern Plains States and eastern Montana. Live-stock warnings were issued for eastern Colorado. High winds and heavy snow occurred in central and parts of northeastern Colorado during the next 24 hours, with temperatures below the freezing point. Warnings of freezing temperature were also issued for Roswell, in the Pecos Valley, on the mornings of the 15th and 16th and temperature near freezing on the 17th. The official in charge at Roswell advised fruit interests at the substations on